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ABSTRACT

This study investigates the relative importance of intonational versus syntactic features in children's comprehension of language. The research employed a methodology in which a sentence was presented orally just prior to a tachistoscopic presentation of a picture in which various components were misrepresented. Subjects were 30 children at each of three grade levels (2, 5, and 9). Besides age differences, the variables under investigation were: (1) whether the misrepresentation involved the presupposed or the asserted proposition, and (2) whether the presupposition was indicated in surface structure by intonation or by syntactic structure. The finding that there was an interaction between age and manner of making presupposition is discussed in detail. It is clearly demonstrated that intonational features are important until relatively late in the developmental course of language acquisition and the shift to sensitivity to syntactic structure occurs during a period when language development is assumed to be complete. The effect of acquisition of reading skills is considered as a possible means of accounting for these findings. (DP)

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INTONATION AND SYNTACTIC STRUCTURE IN THE DEVELOPMENT OF PRESUPPOSITION

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ABSTRACT

Although intonational features in the speech of young children have been considered important, there have been few specific investigations of these features in children's language development. In particular, there have been few attempts to determine the relative importance of intonational vs. syntactic features in children's comprehension of language.

The notion of sentence presupposition, which has been the focus of many recent works in linguistics, provides an excellent opportunity to investigate this question since it appears to be the case that certain types of sentence presupposition may be indicated in surface structure either by intonational pattern or by syntactic structure. For example, the two sentences "It is the girl that is petting the dog" and "The girl is petting the dog" (underlining indicates contrastive stress) are both considered to involve the presupposition that the dog is being petted and to assert that the girl is the one who is doing it.

The present research employed a methodology previously developed for the investigation of presupposition in adult language. This consists of presenting a sentence orally just prior to the tachistoscopic presentation of a picture in which either the presupposed or the asserted proposition may be misrepresented (e.g., a boy instead of a girl, or a cat instead of a dog in the example above). The subject's task is to report whether or not the sentence is a true statement about the picture. Adult subjects show a consistent tendency not to notice discrepancies when they involve syntactically presupposed propositions, whereas they do notice such discrepancies when they involve asserted propositions. Such findings suggest that the listener assumes that the presupposed proposition is true and only checks to see if the asserted proposition is misrepresented.

A slightly modified version of this task was administered to 30 children at each of three grade levels (grades 2, 5, and 9). In addition to age, two other variables under investigation were 1) whether the misrepresentation involved the presupposed or the asserted proposition, and 2) whether the presupposition was indicated in surface structure by intonation or by syntactic structure.

Analysis of variance revealed that all three main effects were signficant at beyond the .005 level; however, the finding of most interest to the present research was an interaction between age and manner of marking presupposition. The results suggest that between the age of 8 and 15 years syntactic structure comes to replace intonation as the primary determinant of presupposition. The responses of the youngest subjects (M=8.3 years) were not affected by syntatically marked presupposition, but were highly sensitive to the effect of contrastive stress. The oldest subjects (M=15.1 years), on the other hand, were not significantly affected by contrastive stress, but responded differentially as a function of syntactic structure. The 5th grade subjects (M=11.2 years) appear to be equally sensitive to both intonation and syntactic structure, but neither had as strong an effect as at the other two age levels.

These results clearly demonstrate that intonational features are important until relatively late in the developmental course of language acquisition and suggest a definite shift from sensitivity to intonation and to sensitivity to syntactic structure during a period when language development has been assumed to be relatively complete. The effect of the role of the acquisition of reading skills is considered as a possible means of accounting for these findings.

INTONATION AND SYNTACTIC STRUCTURE IN THE DEVELOPMENT OF PRESUPPOSITION

The importance of intonational features in the speech of young children has been pointed out by several investigators of child language (Stern and Stern, 1928; Werner and Kaplan, 1963; Lieberman, 1967; Menyuk, 1971); however, very few controlled experiments have actually been conducted in which intonation has been employed as either a dependent or an independent variable. The lack of systematic investigation in this area is testified to by the fact that McNeill's (1970) recent book on the acquisition of language contains no systematic treatment of the role of intonation in language development.

Studies that have been conducted in this area have usually involved the recording and analysis of children's natural speech patterns in an observational setting. On the basis of such observations it has been noted that during the latter stage of babbling, around 8 to 9 months, children usually go through a period, or stage, in which they produce intonational patterns comparable to adult sentence intonation contours (Nakazima, 1962). This period, which is often noted by parents of young children, has been called the "jargon period" since it sounds like language, but is considered to be meaningless. Engel (1973) has noted, however, that such children appear to employ differential intonation patterns to indicate significant differences in meaning. When children begin producing single word utterances, or holophases, significant differences in intonation pattern are employed (Menyuk and Bernholtz, 1969) and when children begin producing multiple word utterances it is possible to clearly observe intonation patterns which appear to mark utterances as assertions, commands, and questions.

While such observational studies can be taken as evidence of the presence of intonational features in the speech of young children, it is clear that only con-

trolled experimental procedures can answer the important question of whether such supersegmental features are truly phonemic in children's utterances. In this regard, an earlier study by the present author (Hornby and Hass, 1970) clearly revealed that children of 3 to 4 years of age have productive control over the intonational feature of contrastive stress and consistently employ this feature to mark the new information or focus of a sentence in a controlled setting. This feature can thus be considered to be meaningful or phonemic for children of this age.

In addition to children's productive use of intonational features, a few studies have been conducted which demonstrate young children's perception of intonation. Kaplan (1969) has demonstrated that children as young as 8 months of age are capable of distinguishing between interogative and declarative intonation patterns, although 4 month old children failed to do so. Regarding the use of contrastive stress, Blasdell and Jensen (1968) have demonstrated that children 2½ to 3 years of age are sensitive to variation in stress level in the performance of a learning task.

Despite the fact that intonational features are present in the speech of young children, and may even be among the earliest phonemic distinctions that children gain control of, no attempt has been made to trace the developmental course of specific intonational features during later stages of language development. The use of intonation has generally been regarded as a stage in the development of particular syntactic structures. For example, in the development of the interrogative structure it has been noted (Bellugi, 1965) that the earliest stage consists of the use of rising intonation to mark the utterance as a question and only later do children develop the ability to employ the specific syntactic devices used for marking the interrogative structure. We do not know, how-

whether children in later stages of language development continue to rely heavily on intonation patterns in their perception and production of language even after they have gained control of the syntactic devices available for this purpose. The question of the relative importance of syntactic versus intonational patterns at various stages of children's language development has not previously been the subject of investigation.

The notion of sentence presupposition, which has been the focus of many recent works in linguistics (Fillmore, 1969, 1971; Lakoff, 1968; Morgan, 1969; Muraki, 1970) provides an excellent opportunity to investigate this question since it appears to be the case that certain types of sentence presupposition may be indicated in surface structure either by intonational pattern or by syntactic structure (Fischer, 1968). The most generally accepted definition of sentence presupposition is that proposed by Strawson (1952) in which presupposition is defined as the relation between two statements, A and B, when the truth of A is a necessary condition for the truth or falsity of B. Thus, a presupposition of a sentence is a proposition that must be true in order for the sentence to be meaningful or have truth value (cf. Garner, 1971). For example, in the assertion "It was the policeman that caught the thief," the fact that the thief was caught is considered to be presupposed, and the focus of the sentence, the assertion proper, is that the policeman is the one who accomplished this fact. The presupposition in such cleft sentence constructions can be seen more clearly by considering the alternative assertion "It was the thief that the policeman caught." This sentence focuses on the thief and presupposes that the policeman caught someone. While such presupposition can be so indicated by the use of such cleft sentence constructions, it has been pointed out by Fischer (1968) that the intonational device of contrastive stress can also be employed to indicate the focus and presupposition of such assertions. Thus, "The <u>policeman</u> caught the thief" and "The

policeman caught the thief" (underlining indicates contrastive stress) have been taken to involve the same presuppositions and focus as the earlier cleft sentence structures. We have then a linguistic phenomenon that can be indicated in the surface structure either by intonation or by grammatical structure. By developing a task that will measure a listener's tendency to discriminate the presupposed versus focused aspects of an utterance, it should be possible to study the relative signficance of intonation and grammatical structure in the development of presupposition.

The task that was developed for this purpose is based on Hutchinson's (1970) proposal that if a listener is asked to make a judgement regarding the verity of an assertion, he will be likely to accept the truth of the presupposition and will attend primarily to the non-presupposed part of the utterance. This is, of course, what is implied in the names "presupposition" and "focus." The specific task consists of having subjects judge whether or not a picture is an accurate representation of a sentence that has been presented immediately before the picture. The pictures were presented tachistoscopically for a duration of 10 msec. This duration was previously established as being sufficiently brief that it is difficult for the subject to notice all aspects of the picture. The subject's tendency to selectively attend to certain aspects of the picture rather than others provides information regarding what he has taken to be the most important part of the sentence, the focus. The presupposed material, being taken for granted, should be relatively ignored in determining the correctness of the picture. From this it follows that if the presupposed part of the seneence is misrepresented in the picture, the subject should be less likely to notice this discrepancy than if the focused, or non-presupposed, part of the sentence is misrepresented. By recording the frequency of such perceptual errors, or failures to notice the discrepancies, under different conditions of presupposition it is possible to derive a

numerical index which represents the extent to which the subject is sensitive to the marking of the presupposition in the surface structure of the sentence. This task has been employed with adults using cleft and pseudo-cleft sentences (Hornby, 1971) and a clear tendency to focus on the non-presupposed part of the sentence was revealed. Adult subjects tended to overlook the discrepancy about twice as often when it was presupposed in the sentence than when it was not presupposed. These results were taken as evidence of the role of surface grammatical structure in the determination of presupposition and are considered to indicate the usefulness of this task for studying presupposition.

In the present experiment 90 children were employed as subjects using a slightly modified version of this task. Thirty children from the 2nd, 5th, and 9th grades in the Public School System in Plattsburgh served as subjects. At each grade level there were approximately an equal number of males and females and the mean ages for the three groups were 8.3 years, 11.2 years, and 15.1 years, respectively.

The specific task consisted of presenting a series of 30 sentences with each sentence followed one second later by the tachistoscopic presentation of a drawing depicting a simple, three component event, that is, an agent performing an action on an object. In twenty four of the pictures, either the agent or the object was different from that stated in the sentence. For example, for the sentence, "It is the girl that is riding the horse," the picture showed a <u>boy</u> riding a horse. The other six pictures correctly represented the sentence that they were paired with and were included in order to break up any set that might develop. Of the 24 experimental sentences, 12 employed the cleft sentence construction, e.g., "It is the girl that is riding the horse," or "It is the horse that the girl is riding." The other 12 sentences employed contrastive stress on either the agent or the object, e.g., "The <u>girl</u> is riding the horse" or "The girl is

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riding the horse." At each grade level, the 30 subjects were randomly assigned to one of two groups. For one group, the misrepresentation involved the part of the sentence that was presupposed, while for the other group, the misrepresentation involved the part of the sentence that was not presupposed. This results in a 3 x 2 x 2 mixed factorial design with age and misrepresented constituent varied between subjects and sentence type, cleft versus stressed, varied within subjects. Each group of 15 subjects was tested in the normal classroom setting. The stimulus sentences were prerecorded and were presented by means of a tape recorder. The stimulus pictures were presented at the front of the room by means of a tachistoscopic slide projector. Subjects were instructed to circle either "yes" or "no" on their answer sheets for each sentence-picture pair - "yes" if the picture correctly represented the sentence and "no" if they noticed a difference. The same stimulus materials for the two conditions were employed for each of the three age levels.

The results consist of the number of times that each subject reported that the picture agreed with the sentence for those conditions in which the picture was not actually a correct representation of the sentence. These results are presented in Table 1. Since there were twelve sentences under each condition, a score of 6 would indicate that, on the average, subjects were overlooking the error approximately 50% of the time. For the cleft sentence structure, it can be seen that about the same number of errors occurred regardless of whether the misrepresentation has been presupposed or not for the second grade subjects; however, by the 9th grade, the number of errors appears to be a function of presupposition. On the other hand, for the stressed sentences, the 2nd grade children made more errors when the misrepresentation was presupposed than when it was not, but this differential responding appears to have disappeared by the 9th grade level.

A three way analysis of variance (Table 2) revealed that the three main effects were all significant at beyond the .005 level. Subjects tended to overlook the misrepresentations more often when they were presupposed than when they were not presupposed. Subjects tended to make more errors when the sentence employed contrastive stress than when it employed the cleft sentence structure, and the frequency of such perceptual errors, or failures tonotice the discrepancy, decreased as a function of age. The most interesting finding, however, was a significant (< .001) three-way interaction between grade level, sentence structure, and presupposed versus nonpresupposed. The tendency for the cleft sentence structure to produce a difference between presupposed and nonpresupposed constituents increased with age, whereas the effect of contrastive stress declined with age. These results are seen most clearly by looking at Fig. 1 and Fig. 2. Fig. 1 presents the mean number of errors as a function of grade level for the sentences employing contrastive stress. Here it can be seen that while there was a clear difference between the frequency of errors for the presupposed versus nonpresupposed misrepresentation for the second grade children, by the ninth grade, the difference has almost disappeared. This is in marked contrast to the trend for the cleft sentence constructions depicted in Figure 2. For the grammatically marked presupposition the second grade subjects revealed almost no difference between the presupposed and the nonpresupposed constituents; however, by the ninth grade a very clear effect of presupposition is revealed with subjects making more than twice as many errors when the presupposition was misrepresented than when the non-presupposed constituent was misrepresented.

While this three way interaction is the most interesting finding of the study, we must also account for the three main effects. The fact that the total number of errors decreased as a function of age is probably due to the increasing perceptual skills of the subjects. Since the pictures were presented for the same duration (10 msec.) at all age levels, the older subjects would be more

likely to notice the discrepancies due to their generally superior perceptual ability. This finding is, thus, not considered to reflect any specific change in the language performance of the children, but rather to be simply a product of increasing perceptual skills. The fact that less errors occurred for the cleft sentences than for the stress sentences may be due to the relative difficulty in comprehending the cleft structure. Previous research (Hornby, 1970) has indicated that the cleft sentence structure is more difficult to comprehend than the active sentence structure which was used for the stressed sentences. If a subject failed to comprehend a sentence or comprehended it incorrectly he might be expected to report that it was not a correct description of the picture even though he may have failed to notice the actual discrepancy in the picture. This interpretation is supported by the fact that the subjects tended to make more mistakes on the sentence-picture pairs that were correct when the sentence was a cleft structure than when it was an active structure with contrastive stress on a constituent. Another possible explanation for these results may, however, lie in the differences between the pictures that were employed for the cleft and stressed sentences. That is, the discrepancies may have been more obvious in some pictures than others, and this result might simply reflect this difference. This explanation is unlikely, however, since the pictures paired with the different sentence types were matched for difficulty on the basis of previous investigations employing these pictures with adults (Hornby, 1971).

The third main effect, the tendency for more errors to occur when the misrepresentation was presupposed than when it was not presupposed reflects the general effect of presupposition on focus of attention in judging the correctness of the picture. These results are consistent with earlier results obtained for adults (Hornby, 1971). The fact that this effect did not interact with age indicates that the phenomenon of presupposition is fairly well developed by the time

children enter the second grade. What does change, however, is the sensitivity to the different ways in which presupposition can be marked in surface structure. This is reflected in the three way interaction between age, sentence type, and presupposition. These results suggest that between the ages of 8 and 15 years (2nd to 9th grade), grammatical structure comes to replace intonation as the primary determinant of presupposition. The responses of the youngest subjects were not affected by syntactically marked presupposition, but were highly sensitive to the effect of contrastive stress. The oldest subjects, on the other hand, were not affected by contrastive stress, but responded differentially as a function of syntactic structure. The 5th grade subjects appear to be equally sensitive to both intonation and syntactic structure, but neither had as strong an effect as at the other two age levels.

The increasing effect of the cleft sentence structure, taken on its own, may be accounted for as being the result of increasing linguistic competence. Other investigators have recently demonstrated significant advances in language skills during this age period (Chomsky, 1969), and the present findings regarding the cleft sentence structure might be taken as one more example of a linguistic skill that is not acquired until relatively late. The declining sensitivity to intonation is more difficult to account for, however. This result appears to suggest a decrease in sensitivity to intonation, at least as it is related to presupposition. Such a trend appears to be contrary to most developmental trends in language behavior. One possible explanation for these findings might be a decrease in auditory sensitivity during this period such that the contrastive stress was simply perceived less frequently by the older children. This explanation is unlikely, however, in the light of the general evidence (Kidd and Kidd, 1966) that auditory discrimination increases or at least stays about the same during this period. Thus, the present results must be accounted for in terms of language development itself rather than general auditory development.

The fact that reading ability is generally developing apace during this period suggests a different possible explanation. One of the most significant differences between written and spoken language is the general absence of intonational contours in the written stimulus. In order to comprehend written materials successfully, the reader must be able to provide the correct intonation pattern himself based on the syntactic structure and punctuation of the written materials. Children learning to read effectively may be learning to rely primarily on syntactic devices for language comprehension and may become less sensitive to intonation in spoken language as a result. If this were the case, it would suggest a significant factor in language development that has not generally been considered before. The best test of this hypothosis might be to conduct the present task with both literate and illiterate subjects. Some preliminary results of our own investigations suggest that there is, in fact, a negative correlation bewtween reading skill and sensitivity to intonation when age is held constant.

In conclusion, the present results indicate that between 8 and 15 years of age there is a definite shift from intonation to syntactic structure as the principle determinant of presupposition, and it has been suggested that the acquisition of reading skills may be one factor which is responsible for this change. The extent to which this developmental change represents a general shift from intonation to syntax during this period of language development can only be determined by further investigation. Such investigation in this severely neglected area of language development will probably be very fruitful and will undoubtedly shed further light on the complex problem of language development.

TABLE 1

Mean Number of Errors for Different Sentence Types as a Function of Age

Grade Level	Sentence Structure			
	Cleft		Stressed	
	Presupposed	Non-presupposed	Presupposed	Non-presupposed
2nd	6.33	6.00	8.33	6.53
5th	4.73	3.33	5.87	4.47
9th	5.33	2.47	5.20	5.13

TABLE 2

Summary of Analysis of Variance for Cleft and Stress Sentences as a Function of Age

Source of Variation	df	Mean Square	F	P
Total	179	--	-	-
Between subjects	89	---	-	-
Grade level	2	100	13.32	<.001
Presupposition	1	78	10.39	<.005
Grade level x presupposition	2	1	.13	NS
$Error_b$	84	7.51	-	-
Within subjects	90	---	-	-
Sentence type	1	67	32.37	<.001
Sentence type x grade level	2	1	.46	NS
Sentence type x presupposition	1	2	.97	NS
Sentence type x grade x presupposition	2	18	8.70	<.001
$Error_w$	84	2.07	-	-

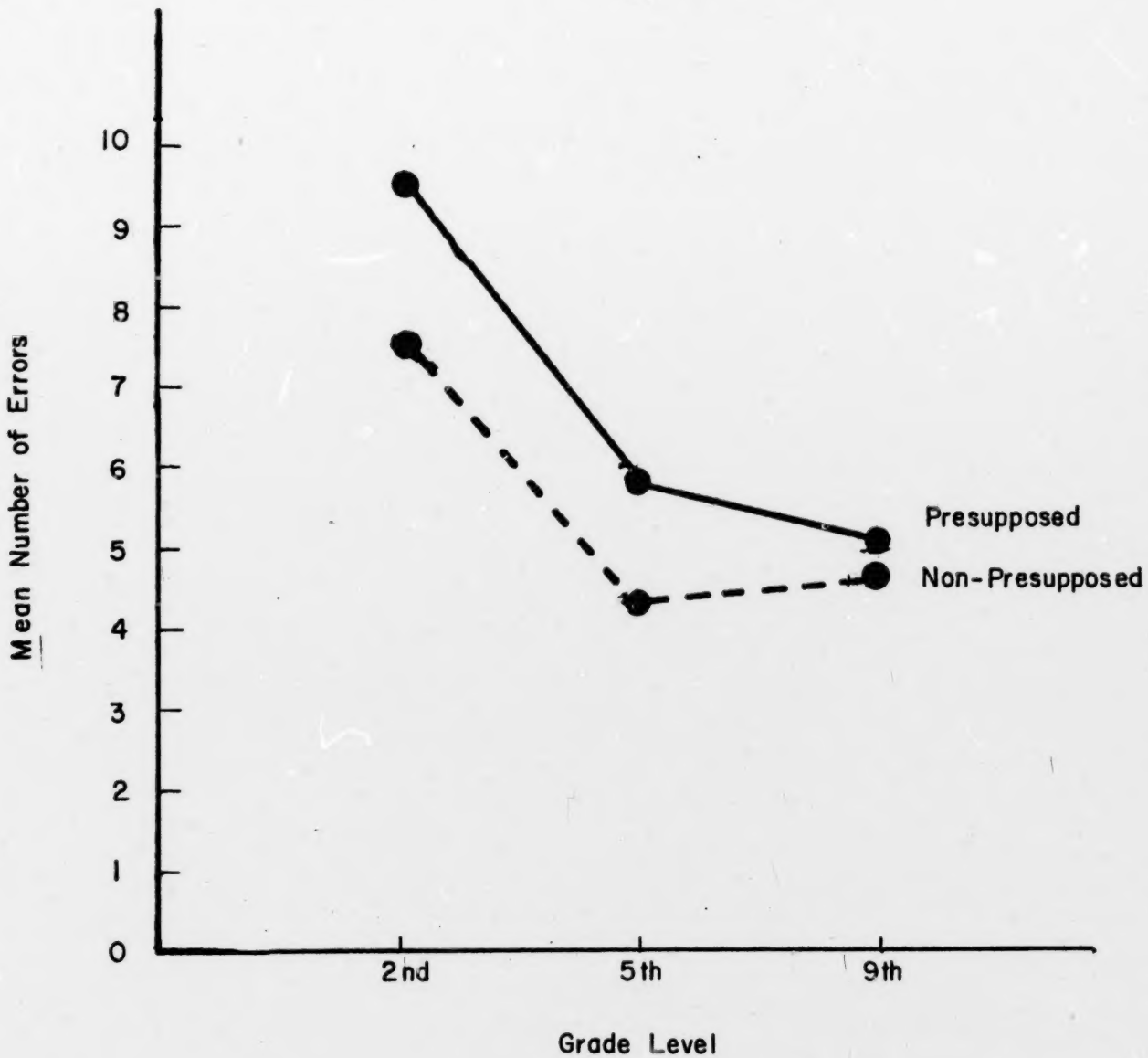

Fig. 1. Mean Number of Errors as a Function of Grade Level for Stress Sentences.

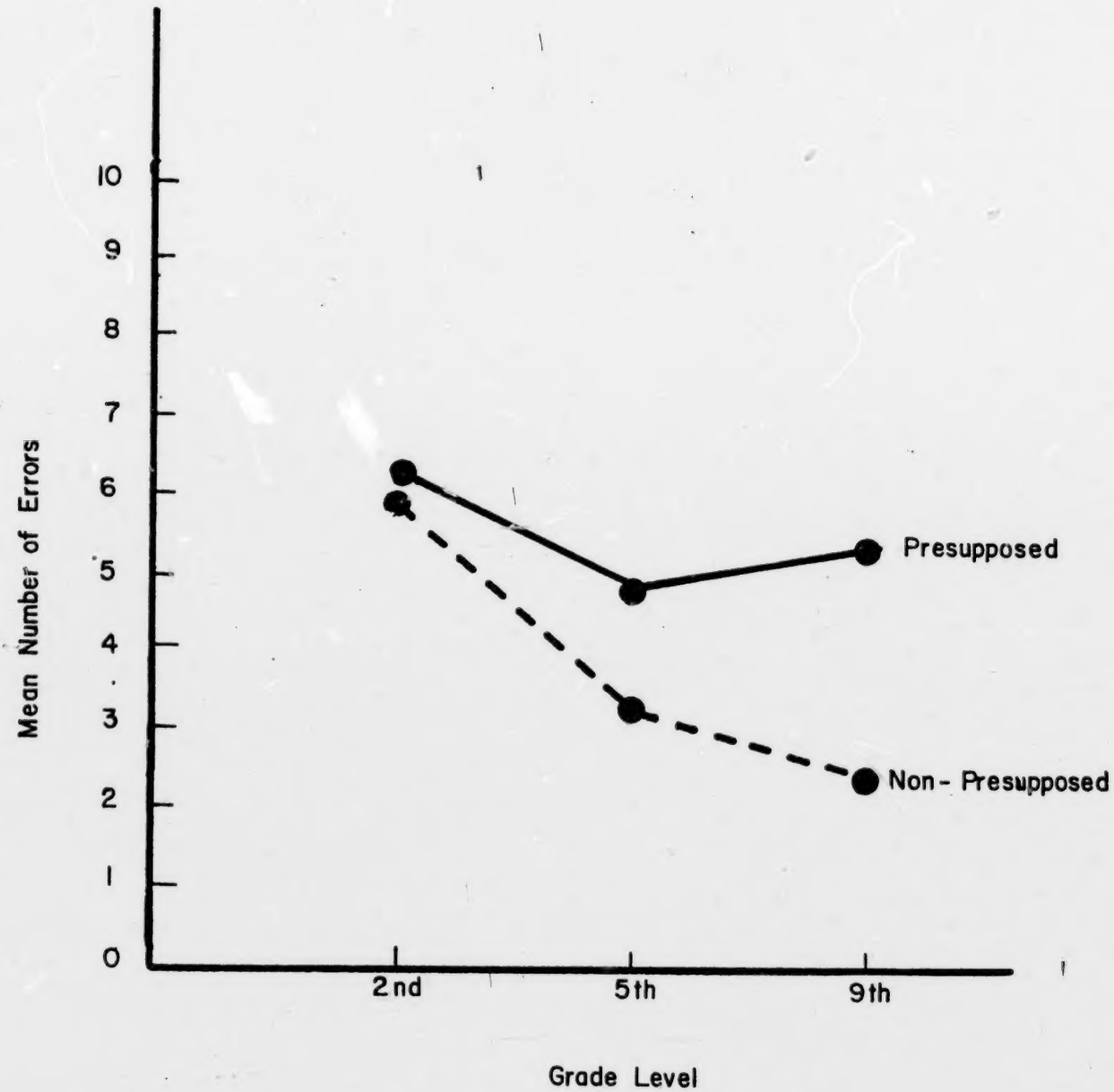

Fig. 2. Mean Number of Errors as a Function of Grade Level for Cleft Sentences.

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